State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

AQUATIC BIODIVERSITY MANAGEMENT PLAN FOR THE BIG PINE CREEK WILDERNESS BASIN OF THE SIERRA NEVADA INYO COUNTY, CALIFORNIA, 1999 - 2005

BY

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The Mission of the Department of Fish and Game is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION AND OBJECTIVES

The movement of trout into wilderness waters of the eastern Sierra began in earnest around the turn of the 20th century. Historical stocking registers account for the quantity in milk cans of brown (often referred to as Loch Leven), brook, rainbow and golden trout stocked into wilderness basins. Cans were transported by packstock to nearly every accessible named lake in the Sierra. The California Department of Fish and Game (CDFG) now utilizes a twin engine turboprop airplane equipped with bomber doors and a GPS (global positioning system) tracking system to stock approximately 246 of the 600 named lakes above 9000 ft elevation in the eastern Sierra fisheries management unit. However, fisheries management activities, including fishery monitoring and evaluation, have not kept pace with fish movement technology. Most of the allotments for trout stocked into these lakes were determined over 30 years ago by experienced biologists using their best judgment and factors such as angler use, lake size, desirable species (from a recreational fisheries perspective), and some site specific fish growth or condition data. Adjustments to trout stocking allotments were made for individual lakes only during years when CDFG staff could spend time away from the demands of other important front-country fishery issues. Until recently, impacts on native biotic communities went largely unnoticed by CDFG biologists, because most lakes had not been revisited for decades.

Reported Sierra amphibian declines (Bradford, 1989) prompted a larger effort toward amphibian population surveys by the CDFG and U.S. Forest Service. With additional documented population losses of the mountain yellow-legged frog (MYLF), *Rana muscosa*, the CDFG began increasing wilderness resource assessment activities and initiated a fisheries and ecosystem management planning program for the eastern Sierra.

One of the major causes of MYLF population losses has been the introduction of trout into originally fishless habitats (Cory 1963; Bradford et al. 1993; Bradford et al. 1994; Jennings 1996; Knapp 1996). Site specific fisheries management plans are needed for all high Sierra waters to assure that trout fisheries are managed in a manner compatible with other native aquatic and riparian resources. Area fisheries management plans will need to comply with individual future species recovery plans or conservation strategies which may impart additional fisheries management constraints. CDFG plans should attempt to optimize recreational benefits while maintaining natural biodiversity using a basin-by-basin approach. The MYLF is a California State and Federal Species of Special Concern, and the U.S. Fish and Wildlife Service is currently assessing the need to list this species as Threatened or Endangered. As of this writing, a MYLF conservation strategy is near completion.

Twenty-one management units, mostly in the eastern Sierra, have been identified for management by CDFG's Bishop office (Figure 1). Most units are defined by watershed boundaries; however, several adjacent smaller basins may be combined to form a management planning unit. Management plans for these areas should be site specific, based on current assessments of fish and amphibian populations, angler use, and the status of key native biota and habitats. Input from CDFG stakeholders will be included.

This first plan focuses on the North and South Forks of the Big Pine Creek Basin. The following objectives are being used to develop the current plan:

Objective 1: Manage wilderness lakes in a manner which maintains or restores native biodiversity and habitat quality, will support viable populations of native species, and provides for recreational opportunities considering historical use patterns. In some areas, most or all of the lakes may be managed as natural reserves, with little or no angling available. Likewise, in areas of high recreational demand, most or all of the lakes may be managed for recreational angling.

Objective 2: Refinements to trout stocking allotments should be based on recent, site-specific data.

Objective 3: For each lake, the species, frequency, and number of trout stocked should be guided by the following provisions:

A) Since MYLF abundance in lakes has declined and is negatively correlated with trout presence, lakes with extant populations of MYLF, or other species of concern, should generally not be stocked. Where a MYLF population exists within close proximity to an established wilderness fishery, an assessment of fishing use and the feasibility of trout removal should be made to determine if the water could be converted to a fishless condition in order to benefit MYLF. Wilderness fisheries management should incorporate objectives of the MYLF Conservation Strategy.

B) Golden trout should be given priority over other trout species and stocked into waters following existing Fish and Game Commission policy (Appendix II). Other species of trout may be stocked to meet other fishery management objectives and for experimental stocking programs; however, the stocking of brook trout should generally be avoided because they are lake spawners and have a greater potential for establishing overabundant, self-sustaining, stunted populations. Brook trout should not be stocked where their range may be extended.

C) Wilderness lakes should be managed to optimize angling opportunity within a given basin. For example, some lakes might be managed for trophy-sized fish, some for fast-action on smaller sized fish, and others for species diversity.

D) Trout should not be stocked into waters with existing self-sustaining trout populations unless needed to meet goals for improving angling diversity, trophy or fast-action fishing, or research. Experimental planting of trout to control undesirable fish populations is not restricted under this provision.

E) In addition to the application of chemicals in lakes, new and innovative non-chemical means to control undesirable fish populations should be encouraged, including the use of stocked, sterile, predatory trout, strains or species of fish not previously stocked, or physical means of removal.

ENVIRONMENTAL SETTING

The Big Pine Creek Basin is within the John Muir Wilderness of the Inyo National Forest on the east slope of the Sierra Nevada. The North Fork Big Pine Creek drainage contains eleven named lakes (Big Pine Lake # 8 is the only CDFG designated name) and numerous unnamed ponds. The South Fork Big Pine Creek drainage contains six named lakes and numerous unnamed ponds. Although Willow Lake is included in this lake listing, it is actually a stream/marsh complex rather than a true lake. Lake maps with associated fishery data are in Appendix I. The Palisade Glacier complex is a prominent feature of the basin.

Area of the basins are approximately 31.7 square miles and 39.0 square miles west above Little Pine Creek and west above the town of Big Pine, CA, respectively. The 50-year average mean water content of the snowpack on April 1 for all snow courses is 18.3 inches, and the average (100% normal) precipitation at the Glacier Lodge rain gage is 16.89 inches (Steve Keef, Los Angeles Dept. of Water and Power). See Appendix II for data on Big Pine Creek total and mean flows from 1932 to 1997.

METHODS

Public scoping to address issues which should be considered in the fisheries management plans for both the Big Pine and Convict Wilderness basins was held on November 26, 1996. Fifteen interested individuals representing local agencies and organizations attended (Appendix II). Major issues included the desire to continue trout stocking activities and to manage for a balance between recreational fisheries and other aquatic species. Representatives from the Eastern Sierra Packers Association suggested that pack train use for trout stocking should be re-instituted where feasible in lieu of aerial stocking.

Fish and amphibian surveys were conducted in the North and South forks of the Big Pine Drainage following the protocol designed by Fellers and Freel in 1995 and modified by Knapp (University of California, Sierra Nevada Aquatic Research Laboratory, pers. com.). To collect fish, each lake was netted with two lightweight Swedish experimental gill nets measuring 1.8m x 36m and having six panels with a mesh size ranging from 10mm to 38mm. Otoliths were extracted from most of the trout caught in gill nets for age determination. Each lake was visually surveyed for the presence and abundance of amphibians. One day of field work was generally required to complete field study objectives for each lake surveyed by a two person crew. Additional surveys were conducted to cover all amphibian habitats, including ponds and streams, and to determine the presence of existing or potential key fish barriers. Fish barriers were identified in the North Fork drainage using the following criteria: presence of a rock barrier with a vertical drop of more than five feet; or a shorter drop, if fish were absent

upstream; or a continuous reach of stream with high gradient and no holding/resting water for trout. Using ArcView GIS software, data were archived and analyzed, and plan alternatives were generated.

Angler use at each water in the basin was estimated through volunteer angler surveys. Two “iron rangers”, or metal survey stations, were put at the wilderness access trailheads, encouraging anglers to provide data for this management plan. The survey form (Appendix II) queried anglers on date, location, fish species caught, number of trout kept and released, trout lengths and condition, fishing effort, and satisfaction. The most useful data appeared to be location(s) fished, since much of the remaining data were of poor quality. To help anglers identify waters, a simple GIS map of the basin was printed on the back of each survey form.

To minimize optical distortion, lake images were scanned from the central third of aerial photographs (approximately 1:15,840 scale; 1993-94) obtained from the Inyo National Forest. Scanned images were georeferenced using Geographic Transformer AVX™ as an ArcView GIS software extension. For comparison of lakes with each other, images were scaled at 1:2,400 (Appendix I).

FISHERIES RESOURCES

Brown (BN), rainbow (RT), brook (BK), golden (GT), and cutthroat trout (CT) have been stocked in the Big Pine Basin (Table 1). CDFG calendar year end stocking records date back to the 1960's, though trout were likely first stocked into some Big Pine lakes near the turn of the 20th century. Further information on fish presence and past stocking allotments are contained in the stream and lake files of the CDFG’s Bishop office.

Wilderness fisheries have been managed for wild trout and "put and grow" hatchery fingerling trout. Many strains of rainbow trout, brown trout, and brook trout have been stocked into backcountry lakes and tributaries, and many of these trout have successfully spawned, producing "wild trout" progeny. The term "wild trout" should not be confused with "native trout", which refers to trout that existed in watersheds prior to European settlement and have a defined natural range without human intervention. All waters in Inyo and Mono counties south of the Walker River drainage, including waters in the Big Pine Basin, have no native trout.

A reduction of stocked trout in 1999 is supported by data collected for this management plan. Stocked trout were observed in many cases to compete with an already overabundant wild brook trout population resulting in slow growth of all trout. In the case of the Thumb lakes, golden trout were simply too numerous in habitats with too little food to yield desirable trout growth.

Hatchery allotments are "goals", and production shortfalls and surpluses may occur in some years. Actual numbers stocked can be affected by the availability of strains, CDFG hatchery budgets, drought, disease, and the severity of winter conditions.

Table 1. Fish species stocked and recent management of the Big Pine Basin lakes.

Name of lake	Fish species stocked historically	1996 fish stocking	1999 fish stocking
First	BN, RT, BK	6,000 RT	6,000 RT annually
Second	BK, RT	9,000 RT	2,000 RT annually or experimental*
Third	BK, RT	5,000 RT	3,000 RT annually
Fourth	BK, RT, BN, CT	5,000 RT	1,000 RT annually
Fifth	BK, RT, BN	8,000 RT	2,000 RT annually
Sixth	BK, RT, BN	Not stocked	Not stocked
Seventh	BK, GT	Not stocked	Not stocked
Eighth	GT	Not stocked	Not stocked
Summit	BK, RT, CT	Not stocked	250 GT annually
Black	BK, RT, BN	4,000 RT	Not stocked or experimental
Sam Mack	BK, RT	Not stocked	Not stocked
Willow	BK	Not stocked	Not stocked
Brainard	BK, RT, GT	Not stocked	Not stocked
Thumb, lower	BK, RT, GT	1,000 GT	500 GT every even year
Thumb, upper	BK, RT, GT	1,000 GT	Not stocked
Finger	GT	Not stocked	Not stocked
Elinore	BK	Not stocked	Not stocked

* Experimental management is discussed in the FUTURE FISHERIES RESEARCH section of this plan.

Brook trout are no longer stocked in the Big Pine Creek Basin, since they generally overpopulate, become stunted, and maintain this condition almost indefinitely. Although brook trout are a prized sport fish, they are commonly a nuisance species in backcountry lakes, and their presence frequently precludes other more desirable resource management options.

Angling regulations for all waters in the Big Pine Creek Basin follow the Sierra District general regulations that allow anglers to harvest 5 trout per day with 10 trout in possession. Additionally, up to10 brook trout per day less than 10 inches total length may be taken and possessed over and above the other daily bag and possession limits specified. The brook trout “bonus bag limit” was adopted to encourage the harvest of brook trout from overpopulated waters such as those found in the Big Pine Creek Basin.

Fifteen Big Pine lakes currently offer anglers the opportunity to catch four trout species. Fish species distributions are derived from stocking records and gill net data (Figure 2). Rainbow trout are stocked and may be maintained through natural reproduction in Black

Lake and Big Pine lakes First through Fifth. However, no rainbow trout were sampled from Second Lake, and only one rainbow trout was caught in Fifth lake, despite 9,000 and 8,000 rainbow trout stocked in each lake, respectively, in previous years. Rainbow trout coexist with brown trout in Big Pine Creek below First Lake. With little or no spawning habitat available, rainbow trout in Sixth and Summit lakes are expected to become extirpated without further stocking. Wild brown trout are present in First Lake and downstream in Big Pine Creek to the Owens Valley. Golden trout are maintained in lower Thumb lake through stocking. Golden trout in upper Thumb lake appear to be maintained by stocking and may become extirpated if stocking were halted. Brook trout are present in all waters, except the Thumb lakes, Summit Lake, Finger Lake, and Eighth Lake.

Most trout caught with gill nets were aged using otoliths. Fork lengths at each annulus were graphed for each species present in each lake (Figure 3.). Trout ages ranged from one year to an estimated 15 years old, with the average age being five years old. In many cases, trout growth slowed after age four, because of a lack of food for larger trout. The exception was brown trout in First Lake, where two large individuals (2,110 g and 1,740 g) were captured that had partially shifted from invertebrates to fish as a primary food source. Trout condition may degrade with age as observed for Sixth Lake brook trout and Black Lake rainbow trout (Figures 4 and 5, respectively).

A total of 152 anglers responded to the volunteer angler use survey (Figure 6). Generally, angler use was not well correlated with angler success, fish size, or angler satisfaction; use was greatest at waters near lower elevation hiking trails; and use was much greater in the North Fork lakes than in the South Fork lakes. The light use of the South Fork lakes is probably due to fewer fishing opportunities and more difficult access to the lakes.

AMPHIBIAN RESOURCES

The CDFG is concerned about MYLF declines in the Sierra range and southern California. Because of competition and predation by trout on MYLF and the similar habitat requirements of these species, introductions of non-native trout in high mountain lakes have been shown to be a major cause of MYLF declines. This fisheries management plan includes MYLF population assessments, and CDFG's future management direction will include these findings to provide more protection and improvement for Big Pine Basin MYLF populations.

Four MYLF populations were present within the NF Big Pine Creek drainage in 1998 (Figure 2). Two populations, one in Eighth Lake and the other in Sam Mack Meadow (Figures 7 and 8, respectively), are in good condition and appear to be at carrying capacity for the habitats available. Both populations have approximately 700-1,000 individuals (adults and tadpoles combined). The remaining two populations, one in a

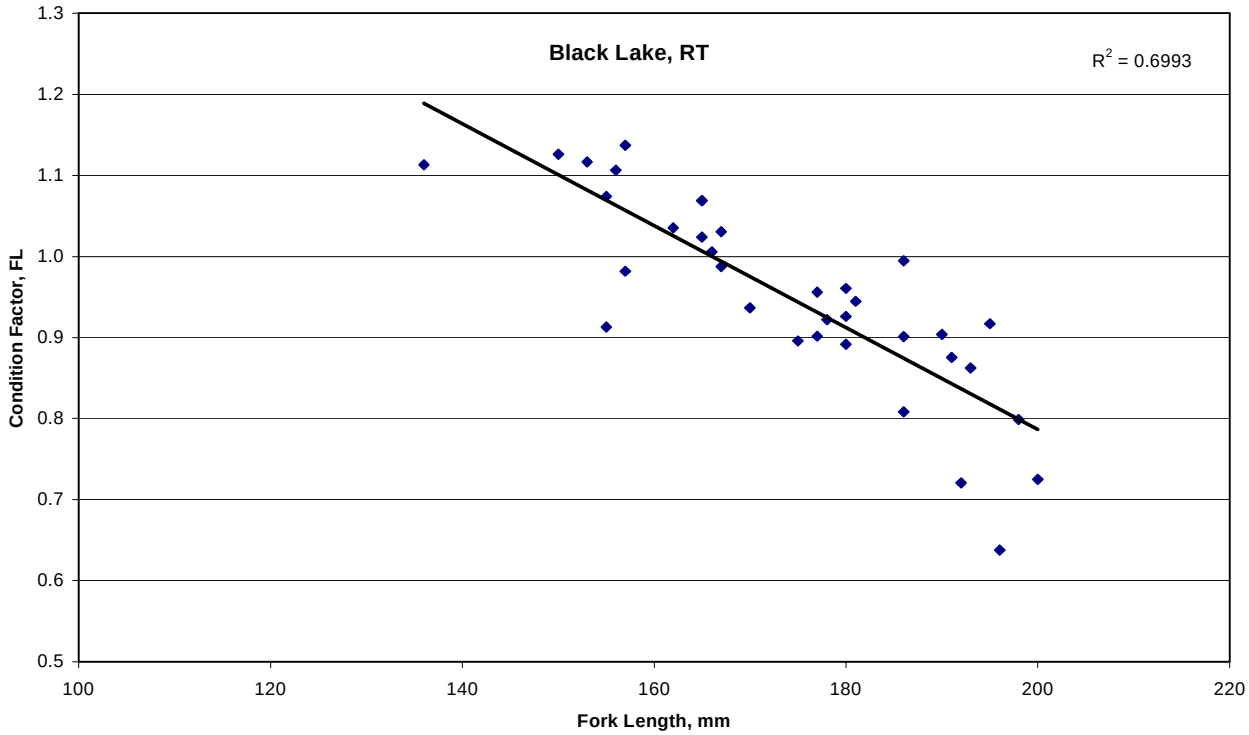

Figure 4. Condition factor at length for Black Lake Rainbow Trout. August, 1996.

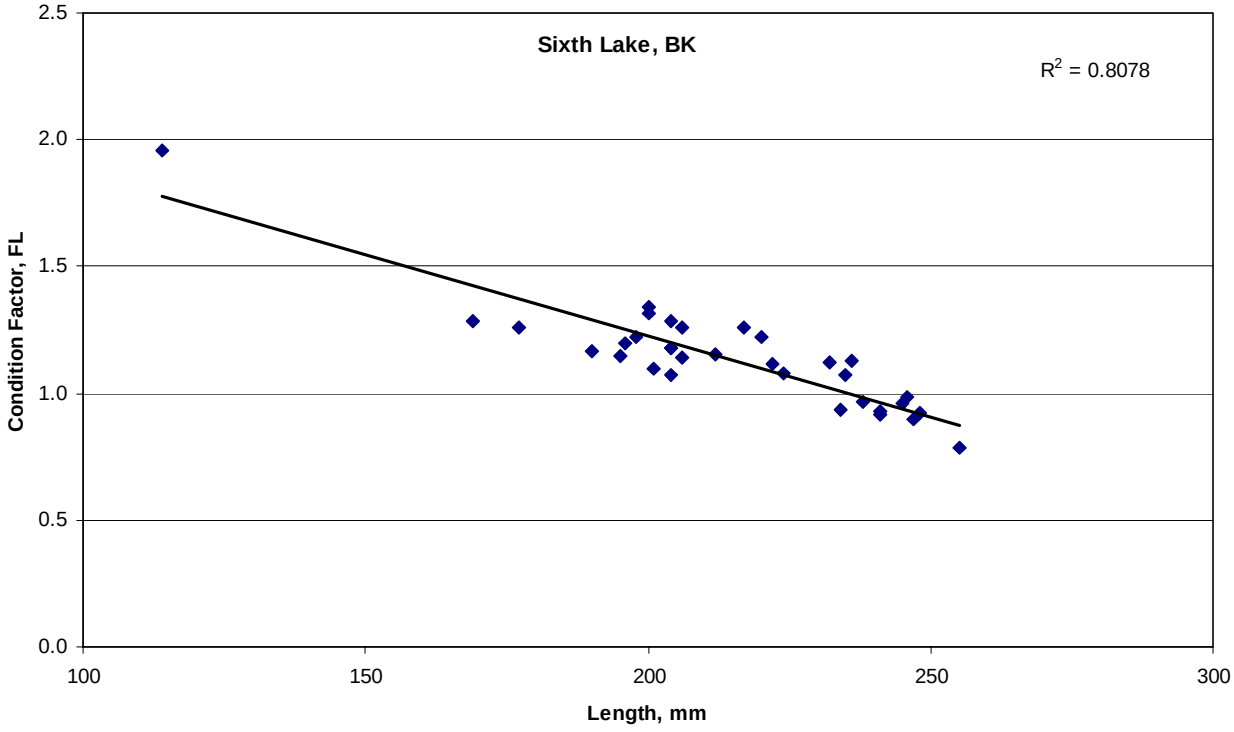

Figure 5. Condition factor at length for Sixth Lake Brook Trout. August, 1996.

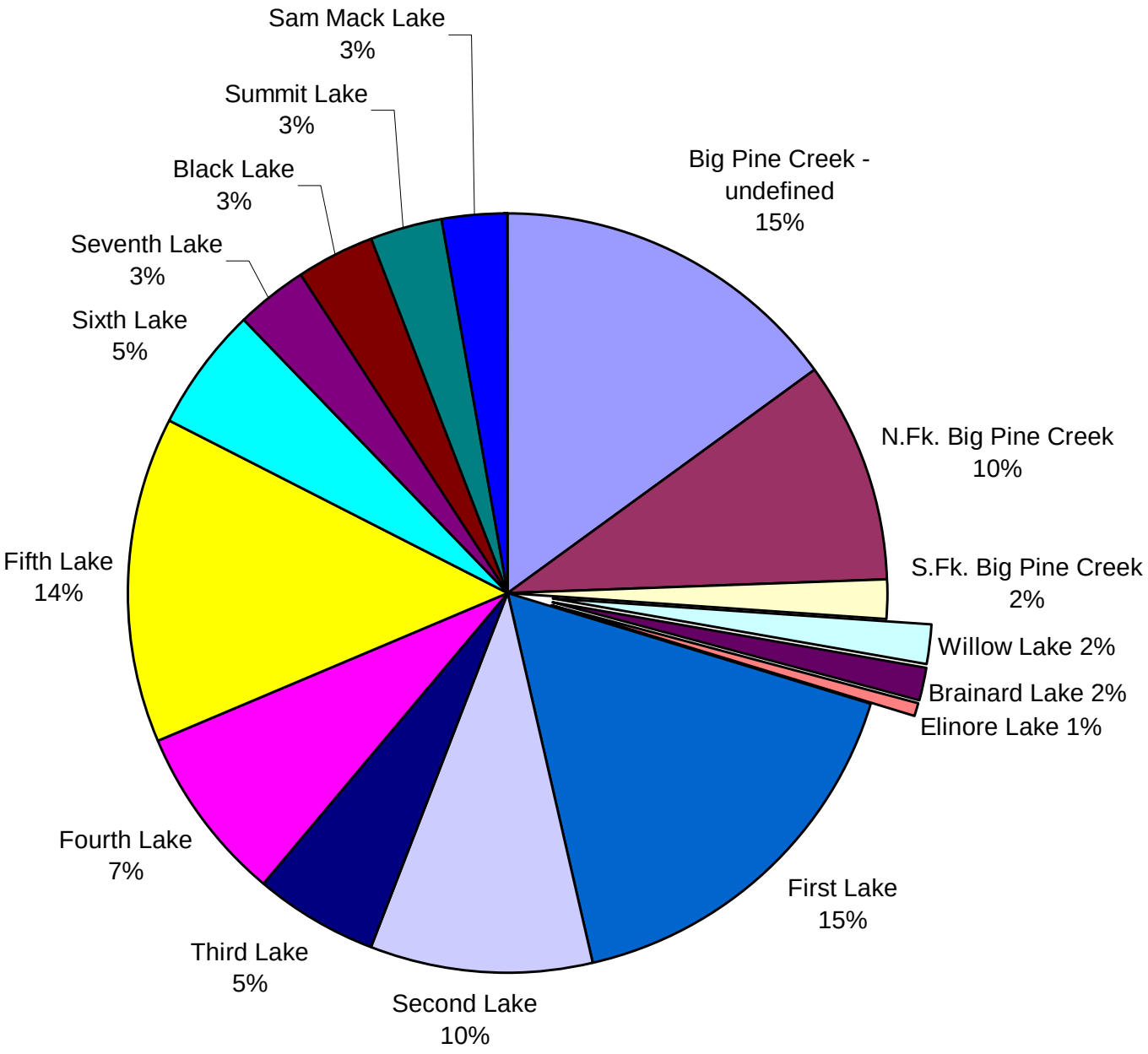

Figure 6. Angler use in the Big Pine Basin from volunteer angler surveys collected, 1995-98.

pond near Seventh Lake (Figure 7) and the other in a meadow south of Summit Lake (Figure 9), were considered in poor condition, with each having an estimated population of less than 70 individuals (adults and tadpoles combined), in 1998. The pond population near Seventh Lake was extirpated in 1999.

Eighth Lake was stocked prior to 1989 with golden trout, but the allotment was canceled that year due to a severe winter, which caused a complete winter kill of trout. Lake surveys have determined that, in the absence of trout, MYLF have proliferated within the lake and surrounding waters. This response is one of the few known examples of natural MYLF population recovery after trout extirpation.

MYLF are currently common in the outlet of Eighth Lake downstream to a small fish barrier. Below the barrier, trout are common and no MYLF were found. A few adult MYLF were observed around the margins of Sixth Lake, but no fishless breeding area is available in the lake. A small population of MYLF inhabited several shallow ponds (<1m deep) adjacent to Seventh Lake in 1998. However, no MYLF were observed in Seventh Lake, located just 2 meters away, but teeming with brook trout. This population became extirpated in 1999 when brook trout invaded the pond habitat.

Trout populations within this upper complex of three lakes (Sixth through Eighth) are isolated from lower elevation populations through a series of fish barriers. To benefit MYLF, these populations could be eradicated, with no chance of unaided trout recolonization,

The small MYLF population below Summit Lake and near Fourth Lake exists in very small isolated pools within an ephemeral stream channel. MYLF recruitment was very low during the three years of recent observation. MYLF are long-lived, and this characteristic has allowed them to survive in the marginal habitats available since the introduction of trout into Fourth Lake. Their status is tenuous and will remain so, unless additional trout-free habitat becomes available, or they may become extirpated.

MYLF in Sam Mack Meadow are isolated from trout and other MYLF populations, and no habitat is available for population expansion. This population needs to be monitored to assure that no trout are introduced into the ponds or adjoining waters.

Tree frogs, *Hyla regilla*, were more common than MYLF in the Big Pine Creek Basin (Figures 10 and 11). No other amphibian species were observed during our aquatic habitat surveys.

FUTURE FISHERIES RESEARCH

Fisheries managers possess several “tools” which they use to manage sport fish populations. Restricting angler harvest of fish through angling regulations are an effective means of protecting fish populations that are vulnerable to overfishing, such as roadside trophy trout fisheries. However, in high mountain lakes, liberal angling regulations to increase harvests rates of over abundant stunted fish populations often do not achieve desired objectives. For example, it is doubtful many anglers take advantage of the brook trout bonus bag regulation (allows 10 brook trout < 10" in length, in addition to the Sierra District 5 trout limit). Because of their remoteness, even an unlimited possession limit may not produce an appreciable increase in trout harvests in many high mountain lakes. Another tool managers use is fish stocking, which is an effective means of maintaining trout populations that are not self-sustaining, increasing species diversity to a fishery, and improving trout growth by altering population density. However, the biggest problem with fish stocking is that it is difficult to remove an unwanted fishery after an introduction has occurred. Fish removal has traditionally been accomplished by using the piscicide, rotenone, which is derived from the roots of several tropical and subtropical plants. While rotenone is also toxic to certain non-target species (gill-breathing invertebrates and tadpoles), these species generally recover rapidly after a chemical treatment. An alternative to rotenone on some smaller waters is trout eradication using gill nets. Some success has been achieved using gill nets to eradicate several small populations of golden and rainbow trout and one very small population (N=97) of brook trout (Knapp, 1998). However, control of most brook trout populations through this method would be difficult because of the large number of fish present, high reproductive potential of this species, and large size and depth of many lakes. More tests of this method of eradication, and other possible fish population control methods, need to be conducted.

In the Big Pine Creek Basin, brook trout are overpopulating 9 of the 15 lakes that contain trout, resulting in poor growth and marginal sport fisheries. The development of other practical means to control brook trout, either through reducing population abundance or by complete population eradication, is necessary. Two experimental approaches for brook trout population control are proposed. The first is to eliminate the stocking of fingerling rainbow trout into Second and Black lakes and replace them with fewer, but much larger, trout that are able to immediately prey upon the abundant supply of smaller brook trout. The objective is to increase brook trout growth by reducing intraspecific competition for the limited food supplies in these lakes. This approach holds promise since these stocked trout would not need to compete with brook trout to attain a large size, but would require a larger food item (brook trout fry and fingerlings) for continued growth and survival. Any trout species of a large size could meet the management objective; however, large brown, cutthroat or tiger trout (sterile hybrid between brown trout and brook trout) are highly piscivorus and may be longer lived and/or more difficult to harvest than large rainbow trout.

A second method, proposed for Sixth and Seventh lakes, uses gill nets and other harvest gear (traps, seines, angling, etc.) to directly remove brook trout. The objective would be to remove all trout from these two lakes during a two-year intensive gill-netting operation. These two lakes would then be left barren of trout to benefit native species, especially MYLF. Brook trout spawning areas (Figure 7) would also be disrupted or made unusable. The full proposal is presented in Appendix II.

These methods, if successful, could be used in many other Sierra lakes to meet site-specific fishery objectives, improve angling recreation, and implement responsible native species management objectives.

PROPOSED MANAGEMENT DIRECTION

Several management directions were developed for this plan to explore the range of fisheries management possibilities. The analysis included actions to 1) increase MYLF (and other native fauna) populations, with the decrease in angling opportunities offset through improved fisheries management elsewhere in the basin, 2) maximize recreational fisheries with increased potential to harm native fauna, 3) increase MYLF (and other native fauna) populations to the extent feasible with a large decrease in angling opportunities, and 4) no action which depicts current fisheries management based on recent assessments. CDFG's management direction, action "1" above, is presented in this section, while evaluations of the other three actions are presented in Appendix II.

This plan is directed mostly toward management of the North Fork of the Big Pine Creek Basin. The South Fork lakes offer less opportunity for fisheries enhancements or amphibian reintroductions. If experimental fisheries management techniques prove successful and cost effective, then Brainard and upper Thumb lakes in the South Fork Basin would be candidates for future management actions.

CDFG's management direction proposes experimental fisheries management in Second and Black lakes initially, with more lakes to follow if results are favorable (Figure 12). A trophy fishery would be established in Summit Lake utilizing golden trout. Trout will be removed from the upper North Fork Basin (Sixth and Seventh lakes) where MYLF should quickly re-colonize former lake habitats. On the South Fork, trout will no longer be stocked at upper Thumb Lake, which will be monitored to determine if the present golden trout population is self-sustaining. MYLF may be reintroduced with an intra-basin transfer into Upper Thumb. Stocking allotments in other basin waters are based on the findings from fisheries resource assessments to date. This management direction is outlined further in the schedule of activities.

EXPECTED BENEFITS

This management plan was developed with a set of objectives based on the CDFG's responsibility to manage all of California's diverse fauna, CDFG policies and management authorities, and our desire to fairly balance the demands upon our venerable resources. It is clear that to develop and implement comparable management plans for all back country waters will be a demanding task requiring cooperation and even encouragement from our stakeholders. However, every future visitor of the Big Pine Basin will not be entirely satisfied with the outcome of our management. Some will contend that all non-native trout should be eliminated, a task not likely to ever be accomplished. Others have difficulty accepting the inherent values of things non-consumptive, like the mountain yellow-legged frog. The intent of this plan is to provide for improved recreational opportunities while maintaining biodiversity. It is our collective responsibility to pass on to future Americans the natural components that we inherited - clean water, beautiful landscapes, wild lands, and the fisheries and native fauna of the Big Pine Creek Basin and elsewhere.

Throughout the Big Pine Creek Basin, fisheries management is being refined based on new information and our current biological understanding of high elevation trout and frog populations. In most cases, trout stocking allotments were reduced to decrease competition for the limited food supplies available in these waters. As a result, trout average size should increase moderately in these lakes. Since brook trout are so very abundant in the basin, there will be no shortage of angling opportunities or fast action waters.

We propose to initiate several experimental trout stockings in Black Lake and Second Lake, and possibly several other lakes containing stunted brook trout, depending on realized benefits. Stocking large piscivorous (fish eating) trout will reduce the enormous numbers of young brook trout, resulting in substantial growth increases of both predatory and remaining brook trout. The current Black Lake fishery is mainly comprised of very slender undernourished trout, averaging only seven inches and 1.3 ounces and almost unsuitable for human consumption. Our goal is to raise the average size by at least an inch and double the current average weight. Black Lake should remain a fast action water, and also provide anglers with healthy, attractive trout.

Summit Lake is the only lake in the North Fork of Big Pine that does not provide spawning habitat suitable for trout, including brook trout. A unique opportunity exists here to manage this water as a trophy fishery. Since no trout reproduction occurs, the CDFG can control which species of trout is stocked and at what density it is maintained (i.e. # of trout/surface acre). A low density trout population, as is present in Summit Lake, yields higher individual fish growth than a high density population. Maintaining this condition will provide angling opportunities for larger (12 to 16 inch) trout, but with lower catch rates (# fish/hr.). Stocking golden trout is favored by the local packer and meets the Fish and Game Commission policy for golden trout management; however, any trout species could be managed to produce a trophy fishery in Summit Lake. The

development of this trophy fishery and improved recreational fisheries management in other waters will offset lost angling opportunities in the two waters that will be converted to a fishless state for the benefit of native fauna.

Removing trout populations from the two upper North Fork waters, Sixth and Seventh lakes, will greatly increase the abundance and stability of the MYLF population that currently inhabits Eighth Lake. These two lakes supported approximately 10% of fishing recreation in the Big Pine Creek Basin in 1999. The loss of angling opportunity at these two lakes should be offset through implementation of fisheries management programs mentioned above. Trout populations in this upper subbasin are isolated from downstream waters by natural fish barriers. Trout above the barriers will be removed by netting and trapping adults and juvenile fish, and by blocking access to spawning habitats. This project is a multi-year effort, and if successful, techniques for conversion of other brook trout waters in the Sierra to either a fishless condition, or in preparation for improved trout management, could be developed.

Finally, golden trout in upper Thumb Lake will no longer be stocked. Use of this fishery is very low, average trout size is poor, and the habitat may not support natural reproduction. A good golden trout fishery still exists in nearby lower Thumb Lake. If golden trout do not maintain a population in upper Thumb Lake, an intra-basin MYLF relocation will be attempted to reestablish them in the South Fork drainage.

SCHEDULE OF ACTIVITIES

Present Plan to Stakeholders:	
Meet with Inyo Forest personnel and Eastern Sierra Packers Association and present management plan for discussion and comment.	Spring 1999 *Completed*
Initiate Experimental Management:	
Determine species and strain of trout to stock into Black Lake for experimental management.	Spring 2000 *Completed*
Secure approval from the Chief of the Department's Fisheries Programs Branch and from the Inyo Forest Supervisor if using a new species or hybrid of trout, as per MOU.	Spring 2001
Collect additional baseline data for future analysis of population response to treatment at Black and Second lakes.	Summer 2000 *Completed*
Coordinate with the local packer to stock approved trout when available.	Summer 2000
Stock GT into Summit Lake to Initiate Trophy Trout Program:	
Secure approval from the Chief of the Department's Fisheries Programs Branch and from the Inyo Forest Supervisor, as per MOU.	Spring 1999 *Completed*
Determine stocking rates and frequency and add to hatchery allotment.	Spring 1999 *Completed*
Remove Trout from the Upper North Fork Basin:	
Collect information on BK population density, size distribution, general movement patterns, and the timing and location of spawning.	Fall 1998 *Completed*
Remove adult trout in Sixth and Seventh lakes by gill nets.	Summer 1999 and 2000 *Completed*
Remove trout in stream between Sixth and Seventh lakes by elecrofishing and trapping.	Summer 1999 and 2000 *Completed*
Disrupt spawning by covering BK spawning habitat, dispersing gravels, directed netting, destroying embryos, etc.	Fall 1999 and 2000 *Completed*
Remove subadult trout in Sixth and Seventh lakes by gill nets.	Summer 2000

Monitor success of the project and remove remaining trout.	Summer 2001 and 2003
Monitor re-colonization of MYLF to upper basin habitats	2003 and 2005
Monitor Upper Thumb Lake's Trout Population and Potential for MYLF Re-introduction.	
Survey upper Thumb Lake trout spawning habitat and young-of-the-year.	Summer 2001
Set gill nets at upper Thumb Lake to determine if GT are self-sustaining.	Summer 2002
Reintroduce MYLF with an intra-basin transfer to Upper Thumb Lake.	When GT are extirpated
Maintain Current Fisheries Management in Other Big Pine Basin Waters.	
Implement trout stocking allotments.	Annually

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APPENDIX I

MAPS AND SURVEY DATA SUMMARIES FOR BIG PINE CREEK BASIN LAKES

The following section provides maps and associated fishery survey data pertinent to aquatic resource management by the CDFG. Each water body being considered in this plan is displayed as a GIS layout with an overlay of current fisheries data (length frequency histogram from gill netting). Each layout has been scaled to 1:2,400 which allows for a quick impression of the relative size of the lake in comparison to all other waters in the basin. Additionally, the scanned aerial photographs are of sufficient detail to characterize surrounding land forms and vegetative types.

Lake Name	Elevation (Feet)	Surface Area (Acres)
First	9,958	7
Second	10,056	28
Third	10,247	12
Fourth	10,720	8.3
Fifth	10,787	20
Sixth	11,088	8
Seventh	11,160	4
Eighth	11,080	1
Black	10,647	9
Summit	10,890	2.5
Sam Mack	11,793	9
Elinore	10,988	6.4
Willow	9,561	2
Brainard	10,234	6
Thumb, lower	10,758	2
Thumb, upper	10,955	1
Finger	10,785	6.5